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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,447	11/10/2003	Xiao Xu	ACE-00101.P.1.1-US	4588
24232 7590 11/15/2007 DAVID R PRESTON & ASSOCIATES APC 5850 OBERLIN DRIVE SUITE 300 SAN DIEGO, CA 92121			EXAMINER BOWERS, NATHAN ANDREW	
			ART UNIT	PAPER NUMBER
			1797	
			MAIL DATE	DELIVERY MODE
			11/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Interview Summary</b>	Application No.	Applicant(s)	
	10/705,447	XU ET AL.	
	Examiner	Art Unit	
	Nathan A. Bowers	1797	

All participants (applicant, applicant's representative, PTO personnel):

(1) Nathan Bowers.

(3) David Preston.

(2) Xiaobo Wang.

(4) \_\_\_\_\_

Date of Interview: 08 November 2007.

Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.

If Yes, brief description: \_\_\_\_\_

Claim(s) discussed: 1 and 72.


Identification of prior art discussed: Wolf and Caillat.

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: See Continuation Sheet.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.



GLADYS JP CORCORAN  
SUPERVISORY PATENT EXAMINER

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

\_\_\_\_\_  
Examiner's signature, if required

## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Applicant proposed amendments (see attached) to the claims describing that the electrode structures are on the same plane, and are used in determining a detectable change in AC electrical impedance. The proposed amendments additionally define that the gap is between electrode elements of different electrode structures.

The proposed amendments appear to overcome the current rejection of record involving the combination of Wolf and Caillat. However, a new search and consideration based on the proposed amendments would be required.

Attachment to Interview Summary 11/8/07

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**Amendments to the Claims**

Applicants amend claims 1 and 72. Claims 1-4, 7-13, 15-26, 29-32, 34-44, 47-50, 72 and 287-289 are pending upon entry of this amendment. Amendments to the claims are provided in the below listing of claims.

**Listing of Claims**

1. (currently amended) A device for detecting cells or molecules on an electrode surface through measurement of impedance changes resulting from attachment or binding of said cells or molecules to said electrode surface, which device comprises:

a non-conductive substrate;

a plurality of electrode arrays positioned on said substrate, wherein each electrode array comprises at least two electrode structures positioned on the same plane and having substantially the same surface area, and further wherein each electrode structure comprises at least two electrode elements and the electrode element width is between 1.5 and 15 times the width of the electrode gap between electrode elements of different electrode structures within said each electrode array;

a plurality of connection pads located on said substrate, wherein each connection pad is in electrical communication with at least one of said electrode structures; and

wherein said device has a surface suitable for cell attachment or growth and said cell attachment or growth ~~on said device~~ results in cellular contact with at least one of said electrode structures further resulting in a detectable change in AC electrical impedance between or among said electrode structures.

2. (original) The device according to Claim 1, wherein the substrate comprises glass, sapphire, silicon dioxide on silicon, or a polymer.

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3. (original) The device according to Claim 2, wherein the substrate is configured as a flat surface.
4. (original) The device according to Claim 3, further comprising a plurality of receptacles, wherein each receptacle is disposed on the nonconductive substrate in a perpendicular orientation thereto, further wherein each receptacle forms a fluid tight container and least one container is associated with an electrode array on the substrate.
5. (CANCELED)
6. (CANCELED)
7. (previously presented) The device according to Claim 1, wherein the electrode elements of each electrode structure are of equal widths.
8. (previously presented) The device according to Claim 1 for detecting cells on an electrode surface through measurement of impedance changes resulting from attachment of said cells to said electrode surface, wherein electrode elements' widths are between about 0.5 times and about 10 times the size of cells used.
9. (previously presented) The device according to Claim 1, wherein electrode elements' widths are in the range between 20 micron and 500 micron.
10. (original) The device according to Claim 1, wherein each electrode array comprises a plurality of evenly spaced electrodes.

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11. (previously presented) The device according to Claim 1, wherein each array of electrodes is organized in an interdigitated fashion.
12. (previously presented) The device according to Claim 1, wherein each array of electrodes is organized in a concentric, sinusoidal, or castellated fashion.
13. (previously presented) The device according to Claim 1, further wherein at least one bus is associated with up to half of the plurality of electrode elements in the at least two electrode structures of each electrode array.
14. (CANCELED)
15. (original) The device according to Claim 13, wherein the bus comprises an electrode which extends around up to half the perimeter of the electrode array.
16. (original) The device according to Claim 15, further comprising a plurality of receptacles, wherein each receptacle is disposed on the nonconductive substrate in a perpendicular orientation thereto, further wherein each receptacle forms a fluid-tight container and each electrode array on the substrate is associated with a fluid-tight container.
17. (original) The device according to Claim 16, wherein each container is shaped as a tube with opposing open ends, one end of which being in fluid-tight contact with the substrate.

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18. (original) The device according to Claim 17, further wherein the diameter of the container at the end in contact with the substrate is smaller than the diameter of the opposing end.

19. (previously presented) The device according to Claim 16, wherein the containers are arranged on the substrate in honeycomb fashion.

20. (original) The device according to Claim 19, wherein the outer wall of each container at its point of contact with the substrate is up to about 2.5 mm from the outer wall of each adjacent container.

21. (previously presented) The device according to Claim 19, wherein the electrodes of each electrode array are of equal widths.

22. (previously presented) The device according to Claim 21 for detecting cells on an electrode surface through measurement of impedance changes resulting from attachment of said cells to said electrode surface, wherein electrode elements' widths are between about 0.5 times and about 10 times the size of cells used.

23. (previously presented) The device according to Claim 21 for detecting cells on an electrode surface through measurement of impedance changes resulting from attachment of said cells to said electrode surface, wherein electrode elements' widths are in the range between 20 micron and 500 micron.

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24. (previously presented) The device according to Claim 21 for detecting cells on an electrode surface through measurement of impedance changes resulting from attachment of said cells to said electrode surface, wherein the gap between electrode elements of the electrode structures ranges from 0.2 time and 3 times the width of an averaged cell used.

25. (previously presented) The device according to Claim 1, further comprising an impedance analyzer electrically connected to all or a plurality of the electrical connection pads.

26. (original) The device according to Claim 25, wherein the impedance is measured at a frequency ranging from about 1 Hz to about 1 MHz.

27. (CANCELED)

28. (CANCELED)

29. (original) The device according to Claim 19, wherein the containers together form a multi-well bottomless microtiter plate.

30. (original) The device according to Claim 29, wherein the number of wells present in the bottomless microtiter plate is a number between 6 and 1,536.

## DRAFT

31. (previously presented) The device according to Claim 19, wherein less than all of the containers are associated with at least one of said plurality of electrode arrays.

32. (previously presented) The device according to Claim 30, wherein less than all of the containers are associated with at least one of said plurality of electrode arrays.

33. (CANCELED)

34. (original) The device according to Claim 19, wherein the diameter of one or more containers is, at the container end disposed on the substrate, between about 3 and 7 mm.

35. (original) The device according to Claim 1, wherein the electrodes are fabricated on the substrate by a laser ablation process.

36. (previously presented) The device according to Claim 1, wherein the electrode arrays are individually addressed.

37. (original) The device according to Claim 1, further comprising: one or more capture reagents immobilized on the surfaces of the at least two electrodes in each electrode array, wherein the capture reagents are capable of binding target cells and/or molecules.

38. (original) A method for assaying target cells and/or molecules in a sample, which method comprises:

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a) contacting one or more electrode arrays of the device of Claim 1 to a sample containing or suspected of containing target cells and/or molecules; and,

b) determining whether a change in impedance occurs between or among electrodes in one or more said electrode arrays;

wherein a detectable change of impedance is indicative of the presence of target cells and/or molecules in said sample, and capture of said cells and/or molecules on the surface of said one or more electrode arrays.

39. (original) The method according to Claim 38, wherein the sample is a biological sample comprising culture media sufficient for target cell growth.

40. (previously presented) The device according to Claim 1, further comprising: an impedance analyzer and connection means for establishing electrical communication between the connection pads and the impedance analyzer.

41. (original) The device according to Claim 40, wherein the connection means comprises a mechanical clip adapted to securely engage the substrate and to form electrical contact with a trace.

42. (original) The device according to claim 41, wherein the mechanical clip is adapted to form an electrical connection with a printed-circuit board (PCB).

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43. (original) The device according to Claim 1, wherein the target cells or molecules are captured on an electrode surface.

44. (original) The device according to Claim 4, wherein a perimeter of the container is contained within the outer perimeter of the electrode arrays.

45. (CANCELED)

46. (CANCELED)

47. (original) The device according to Claim 13, further comprising a plurality of receptacles, wherein each receptacle is disposed on the substrate in a perpendicular orientation thereto, further wherein each receptacle forms a fluid-tight container, and at least one receptacle is contained within a perimeter formed by the buses at a plane of contact between the receptacles and the substrate.

48. (previously presented) The device according to Claim 47, wherein each container is shaped as a tube with opposing open ends, one end of which being in fluid-tight contact with the substrate.

49. (original) The device according to Claim 48, wherein the diameter of the container at the end in contact with the substrate is smaller than the diameter of the opposing end.

50. (original) The device according to Claim 47, wherein the containers are arranged on the substrate in honeycomb fashion.

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51 – 71 (canceled)

72. (currently amended) A device for monitoring cell-substrate impedance, which device comprises:

- a) a non-conducting substrate;
- b) at least two electrode structures fabricated to the same side and plane of said substrate, wherein:
  - i) each of said at least two electrode structures has at least two electrode elements; and
  - ii) said at least two electrode structures have substantially same surface area;
  - iii) said electrode elements and gaps between said electrode elements are arranged so that there is a more than 50% probability for cells to contact an electrode element when said cells are introduced onto said device; and
- c) at least two connection pads located on said substrate,

wherein said device has a surface suitable for cell attachment or growth and said cell attachment or growth ~~on said device~~ on any of said at least two electrode structures results in detectable change in AC electrical impedance between or among said electrode elements.

73 – 286 (canceled)

## DRAFT

287. (previously presented) The device according to Claim 1 for detecting cells on an electrode surface through measurement of impedance changes resulting from attachment of said cells to said electrode surface, wherein the gap between electrode elements of electrode structures ranges from 0.2 time and 3 times the width of an averaged cell used.

288. (previously presented) The device according to Claim 1 for detecting cells on an electrode surface through measurement of impedance changes resulting from attachment of said cells to said electrode surface, wherein the gap between electrode elements of the electrode structures is between about 3 microns and 80 microns.

289. (previously presented) The device according to Claim 21 for detecting cells on an electrode surface through measurement of impedance changes resulting from attachment of said cells to said electrode surface, wherein the gap between electrode elements of the electrode structures is between about 3 microns and 80 microns.